

# PATENT SPECIFICATION

DRAWINGS ATTACHED

923.564



Date of Application and filing Complete Specification: April 7, 1961.

No. 12640/61.

Application made in Germany (No. S67972 VIIId/21c) on April 8, 1960.

(Patent of Addition to No. 898,582 dated June 24, 1960.)

Complete Specification Published: April 10, 1963.

Index at acceptance:—Class 37, M1(C2:C3:CX:K), M3(F:G3:GX).

International Classification:—H01g.

## COMPLETE SPECIFICATION

### Improvements in or relating to methods of applying a Protective Coating to Electrical Components

We, SIEMENS & HALSKE ATIENGESELLSCHAFT, a German Company of Berlin and Munich, Germany, do hereby declare the invention for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to methods of applying a protective coating to electrical components in a manner such that the components are rendered substantially moisture-proof.

This invention is an improvement in or a modification of the invention in Patent Specification No. 898,582 in which there is claimed in Claim 1 therein:—

A method of applying a protective coating to electrical components each having connecting leads extending therefrom, wherein a number of the components is positioned between two longitudinally extending metallic strips in such a way that the components are spaced from each other in the direction of the length of the strips and that the leads extend beyond the longitudinal edges of the strips, wherein a molten insulating substance which is solid at the normal working temperature of the component is introduced into the spacing between the two strips so that those portions of the components which are exposed are contacted by the insulating substance and wherein a firm bond is established between the metallic strips and the insulating substance.

The components thus produced are separated from each other by cutting e.g. sawing, through the protective coating at positions between adjacent ones of the components after the insulating substance has hardened.

The components e.g. capacitors, produced according to this method are protected by metal layers on the two largest outer surfaces thereof, whereas the four remaining smaller faces are protected only by the insulating substance. This protection alone is sometimes insufficient when the requirements in respect of the protection against the ingress of moisture into the said substance are more stringent.

[Price 4s. 6d.]

Accordingly, it is an object of this invention to provide an improved degree of such protection in electrical components.

The present invention consists in a method of applying a protective coating to electrical components, as claimed in any of Claims 1 to 6 in Patent Specification No. 898,582, wherein each component is initially covered with a metallic foil on at least those sides of the component which do not face either of the said metallic strips.

A metallic coating is thus provided on all sides of the component.

Preferably, the spacing between the connecting leads and the metallic foil is smaller than the spacing which would be necessary in order to prevent a break-down at the operating voltage of the component if the leads were air spaced only from the said foil. This is made possible by the fact that the said spacing is not air-filled but is surrounded by a casting resin. The spacing can therefore be made as small as the permissible "break-down" path in the casting resin.

A particularly favourable adhesion between the metallic foil and the casting resin is obtained when the metallic foil e.g. a roughened aluminium foil, is coated with synthetic resin at least on those sides thereof which face the component.

In order that the invention can be fully understood a preferred embodiment thereof will now be described with reference to the accompanying drawing in which:—

Figure 1 illustrates a plan view of a metallic foil stamping prior to the covering of the component;

Figure 2 illustrates a sectional end elevation of a capacitor including a protective coating produced in accordance with the invention; and

Figure 3 illustrates a sectional side elevation of the capacitor illustrated in Figure 2.

Referring now to Figure 1 there is illustrated a metallic foil used for covering each component. The foil has been conveniently

50

55

60

65

70

75

80

85

90

stamped out into the shape illustrated. The full lines indicate the cut edges and the broken lines represent folding lines. A narrow slot 3 is provided at each end of the foil and an aperture 2 is centrally located with respect to both the length and the width of the foil. The end of each slot 3 and the aperture 2 are arranged to accommodate the connecting leads in the component to be covered.

Initially one of the connecting leads is passed through the aperture 2 and the foil is then folded to cover the "narrow" sides of the component; the two sections containing the slots 3 overlap by an amount such as to permit the other connecting lead to be embraced by the ends of the slot 3. The remaining portions of the foil which are not in contact with the component are then folded over onto the two remaining "large" sides thereof so as to partly cover these sides.

A plurality of such components is then inserted between the two clamping frames in the apparatus described in the aforementioned Patent Specification in a manner such that those sides of the component which are only partly covered face the metallic strips. An insulating substance, preferably a synthetic casting resin, is then caused to flow around each of the components so that the metallic foils and strips are cemented to the components. The casting process is preferably effected in a vacuum.

Referring now to Figures 2 and 3 there is illustrated one manner in which an electrical component, a capacitor, is covered with metallic foil by a method according to the invention.

A capacitor 6 is covered by a metallic foil 1 and two connecting leads 7 of the capacitor extend through, and are spaced from, the walls of an aperture 2 and the ends of a pair of slots 3, respectively, formed in the foil. The capacitor is located between the aforesaid metallic strips (indicated by the reference numeral 4) and is embedded in a casting resin 5.

The metallic foil preferably consists of aluminium the surface of which is roughened since if the said surface were smooth there would be a danger that the casting resin would not adhere to the foil, and further, that the resin may not penetrate into the spacing between the foil and the component itself.

The metallic foil may conveniently be coated with an insulating synthetic resin at least on that surface thereof which faces the component, and in this case in order to en-

sure that the connecting leads 7 do not come into direct contact with the metallic foil the coated resin may be caused to protrude beyond the edges of the foil bounding the aperture 2 and the slots 3.

Alternatively, distance-pieces of an insulating substance are inserted between the leads 7 and the foil adjacent thereto.

WHAT WE CLAIM IS:—

1. A method of applying a protective coating to electrical components as claimed in any of Claims 1 to 6 in Patent Specification No. 898,582, wherein each component is initially covered with a metallic foil on at least those sides of the component which do not face either of the said metallic strips.

2. A method as claimed in Claim 1, wherein the connecting leads of each component extend through the metallic foil and are spaced therefrom by the insulating substance by an amount sufficient to prevent a break-down at the operating voltage of the component, and wherein the composition of the said substance is such that the width of the said spacing is less than that width which would be required to prevent such break-down if the leads were air spaced only from the said foil.

3. A method as claimed in Claim 1 or Claim 2, wherein the metallic foil is roughened and is initially coated with the insulating substance on at least those faces thereof which face the said component.

4. A method as claimed in any of Claims 1 to 3, wherein the connecting leads are spaced from the metallic foil by distance-pieces consisting of the said insulating substance.

5. A method as claimed in any of Claims 1 to 4, wherein the metallic strips and the metallic foil consist of aluminium.

6. A method as claimed in any of Claims 1 to 5, wherein the insulating substance consists of a synthetic resin.

7. A method as claimed in any of Claims 1 to 6, wherein the components are capacitors.

8. A method as claimed in any of Claims 1 to 7, including the further step of separating the electrical components from each other by cutting through the protective coating at positions between adjacent ones of the components.

9. A method of applying a protective coating to electrical components substantially as herein described with reference to the accompanying drawings.

For the Applicants,

G. F. REDFERN & CO.,  
Redfern House, Dominion Street,  
London, E.C.2.

Leamington Spa: Printed for Her Majesty's Stationery Office, by the Courier Press (Leamington) Ltd.—1963. Published by The Patent Office, 25 Southampton Buildings, London, W.C.2, from which copies may be obtained.

60

65

70

75

80

85

90

95

100

105

110

923564      COMPLETE SPECIFICATION  
1 SHEET      *This drawing is a reproduction of  
the Original on a reduced scale*

Fig.1

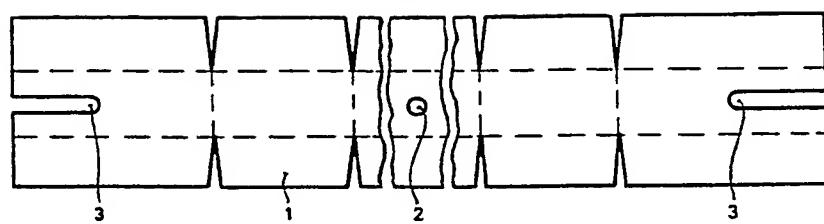


Fig.2

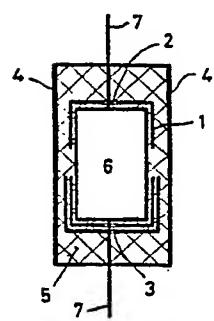


Fig.3

